KENT
UNIVERSITY OF KENT
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SNORS EXTRAS

RATIO, BAR_Col, BAR_B&W

USER MANUAL

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APRIL 1997

RATIO

Introduction

RATIO is an alternative version of SNORS which displays a "ratio" in the zoom window, instead of the oral and nasal airflow traces. In all other respects, RATIO is identical to SNORS.

The "ratio" is calculated using the equation:

$$\text{Ratio} = \frac{\text{Nasal} - \text{Oral}}{\text{Nasal} + \text{Oral}}$$

This results in values ranging from +1 (representing totally nasal airflow) to -1 (representing totally oral airflow). A value of 0 represents either no airflow or equal nasal and oral airfolws. The advantage of ratio is that airflow due to breathing is reduced in the resulting waveform. Ratio is the display method used in NORS – the predecessor of SNORS.

As well as displaying a continuous waveform of the value, ratio, "ratio" is also calculated for the whole zoom window, representing the value for the total nasal and oral airflow during the selected time interval.

Operation

Operation of RATIO is exactly the same as the standard SNORS software, so the instructions in the standard SNORS manual can be followed. The only difference is in what is displayed in the zoom window, either after a test has been performed or when previous data has been retrieved. [Note that the data for the two programs are identical – data saved using SNORS can be retrieved using RATIO, and vice-versa.]

Results are displayed in a graphic 'Main Window'. Speech Envelope (red), Nasal Airflow (green) and Oral Airflow (yellow) are displayed, exactly as for SNORS.

At this stage a dynamic zooming facility enables the user to choose and expand any part of the test which is required. This is achieved by moving the WHITE rectangle over the desired area and pressing the '↵' key on the keyboard. An expanded view is displayed in the 'Zoom Window'. The dispaly in the 'Zoom Window' contains just two traces – Speech Envelope (red) and Ratio (light blue). This useful facility helps by allowing a closer study of the airflow during phonation of each individual word, and also of the events taking place prior to and subsequent to that word.

The rectangular zoom selection rectangle can be moved to the LEFT or to the RIGHT by using the corresponding cursor keys ('←','→') on the keyboard, and its width can be increased or reduced by using the UP('↑') or DOWN('↓') cursor keys respectively. Pressing ↵ displays the selected 'Zoom View' in the 'Zoom Window'. Pressing ↵ again makes the 'Main Window' active again, allowing a new selection to be made. **It is important that the entire zoom rectangle is visible on the screen when zooming** as, if part of the rectangle is off the screen, invalid data will be displayed. Likewise, if the width of the rectangle is reduced to a single line, further presses of the ↓ key will cause the rectangle to increase in size again. **This should also be avoided** as invalid data will again be displayed.

The "Ratio" and "Nasalance" values are displayed in the bottom left-hand corner of the screen.

"Ratio" is the difference between the nasal and oral airflows (nasal-oral) divided by the total airflow (nasal+oral), **in the 'Zoom Window'**. "Nasalance" is the total nasal airflow (nasal) divided by the total airflow (nasal+oral), **in the 'Zoom Window'**.

NASALANCE

The nasalance figure calculated by SNORS is based on the **total** airflow visible in the zoom window. If this window contains elements of zero flow or respiration, these will be included in the calculation. Periods of zero flow will simply reduce the sensitivity of the calculation and will not introduce any specific errors. Hence, small periods of zero flow, within the zoom window, are quite acceptable. Periods of respiration, however, will **significantly** affect the nasalance calculation. Thus**, it is most important that they are excluded from the zoom window**, unless it is required that their effect should be included.

The speech envelope channel is helpful in determining which parts of the flow waveform are due to speech and which are due to respiration – there should normally be very little sound during respiration. However, a little care should be exercised as breathing is sometimes audible and some sounds – such as sibilants – have a low acoustic level. But, with a little practice and a knowledge of speech production, it should be fairly easy to select the appropriate sections of the waveform for use in nasalance calculations.

RATIO

The ratio figure calculated by SNORS is also based on the **total** airflow visible in the zoom window. If this window contains elements of zero flow or respiration, these will again be included in the calculation, but their effect will be less significant. As for ratio, periods of zero flow will simply reduce the sensitivity of the calculation and will not introduce any specific errors. Hence, small periods of zero flow, within the zoom window, are quite acceptable. Although the effects of respiration are **reduced** in the ratio calculation**, it is still recommended that they are excluded from the zoom window**, unless it is required that their effect should be included.

As for nasalance, the speech envelope channel is helpful in determining which parts of the flow waveform are due to speech and which are due to respiration – there should normally be very little sound during respiration. However, a little care should be exercised as breathing is sometimes audible and some sounds – such as sibilants – have a low acoustic level. But, with a little practice and a knowledge of speech production, it should be fairly easy to select the appropriate sections of the waveform for use in ratio calculations.

A third window, at the bottom right, explains the various key options and defines the two traces.

If required, the gain of the microphone can be increased in the zoom window. This is done by pressing the 'M' key [Note that, as "ratio" is normalised to be in the range +1 to -1, gain control in not appropriate and so not provided]. Each press doubles the gain until the maximum is reached, at which point the gain falls back to the minimum value.

A hardcopy of the screen can be obtained by pressing 'P'. This gives a choice of either a Deskjet, LaserJet or Epson (dot matrix) printer. The correct printer should be selected by entering the appropriate number.

It is also possible to export the data to an ASCII file, for subsequent manipulation by a commercial data manipulation package. To export data, press 'E' and enter a valid DOS filename, when requested.

To exit from this screen, press 'Esc'.

BAR_Col

BAR_Col is a more powerful real time display (for use in therapy) than the "BAR" option provided within the SNORS program. As for "BAR", a bi-directional bar appears in the centre of the screen. Movement of the upper bar, *upwards* away from the centre line, indicates *nasal* airflow – the greater the movement, the greater the instantaneous airflow. Movement of the lower bar, *downwards* away from the centre line, indicates *oral* airflow. Once again, the greater the movement, the greater the instantaneous airflow. For convenience of recording flow levels, scales are provided on either side of the bar display.

If required, the sensitivity of either the nasal or the oral bars can be increased by pressing the 'N' and 'O' keys, respectively. Each time a key is pressed, the sensitivity is increased until the maximum value is reached. At this point, the next press returns the sensitivity to its lowest value, from whence it can be increased again by further key presses. The sensitivity of each bar is represented a a number in the range 1-6. These numbers are shown at the left side of the screen.

Because the bars move rapidly, following changes in airflow, it is often difficult to determine the peak airflow values, during an utterance. For this purpose, yellow arrows are provided, to the left of the bar display. These arrows show the last peak nasal and oral flow levels. The arrows can be reset by pressing the 'R' key.

To the right of the bar display, two markers are provided. These allow the therapist to set pointers to target flow levels. These markers are initially off (not visible). They are activated by pressing the 'K' key (for the nasal flow marker) and/or the 'Z' key (for the oral flow marker). Further key presses (or holding a key down) will move the markers up (nasal flow) or down (oral flow) the screen – i.e. in the direction of increasing flow. The markers can be moved in the opposite directions (decreasing flow) by pressing the 'M' key (nasal flow) or the 'A' key (oral flow). To clear the markers from the display, press 'C'.

BAR_B&W

This is a black & white version of BAR_Col. It is useful if SNORS is run on a monochrome laptop computer, as it provides a brighter display. Operation is identical to BAR_Col.